



Newsletter for January 2023

2023: Innovation, Routinized

By Zennith | January 28, 2023

We're chugging along here! A lot of the things our organization is doing are starting to become, from my perspective, routine.

That's an incredibly exciting thing to say.

Routine isn't boring. To the contrary, *routine* signifies that the people making up our organization are hitting their strides, setting and achieving goals, and are benefitting from the support systems we've put in place for them.

Routine means working with predictability and efficiency. It means not making mistakes and having to repeat work. Yet, we haven't lost any of the urgency with which we were moving in 2018, nor any of the creativity or pragmatism that have become part of our culture.

Speaking of culture. This is seriously one of the best environments I've ever worked in. It's mission-driven, genuine, and a chance for us to change the world. Our volunteers go out of their way to help each other. In meetings, people frequently ask questions and offer ideas to each other. It's phenomenal! People are genuine, and many new friendships have taken root. Speaking personally, a few of the people in our community have become some of my best friends.

Research, community building, advocacy, administration, and even just keeping the lights on are a blast with these folks.

What can we look forward to in 2023? Or, more explicitly: what can we get done this year to get closer to freedom of form? We've been putting our heads together to answer that question.

Without losing the forest for the trees, **here are the biggest research deliverables we're aiming for in 2023:**

- Anatomy Re-engineering Framework - public beta test for a selected anatomical system in Q4.
- Integument Review Project - post fully written review (in multi-chapter format) of fur, feathers, and scales, including basic biology and relevant engineering proposals, by the end of Q2.
- Wnt Peptide Project - bioengineer a peptide to interact with Frizzled proteins known to be involved in making fur soft. Submit manuscript to peer-reviewed journal by the end of Q4.
- Enhanced Tail Project - demonstrate low-noise way of detecting and measuring muscle movement in Q1 or Q2. Demonstrate input-output motor control, preferably in a realistic tail device, in Q3-Q4.
- Initiate another "Review" project for a different anatomical system, to build understanding and kickstart engineering of that system.

Here's some more details:

Our Anatomy Re-engineering Framework project team is getting closer to a functional CAD program for realistically modeling and editing patient-specific anatomy, in support of engineering as well as, eventually, surgical planning. In Q1, the team aims to make the code repositories more maintainable. Flat and irregular bones will be implemented in Q2 extended from our existing models, and in Q3, individual bones in the head, feet, or tail will be created. This will let us evaluate how well the underlying codebase is performing, test meaningful editing/customization of anatomy, and make any adjustments, before

the beta in Q4. Overall, the theme for the project in 2023 is more heavily implementation and coding, built on the innovative conceptual work from 2021-2022 (special shoutouts to Kistaro, SiberDrac, Liz, and Atha for model and system-level concepts!)

Our Integument Review project team - consisting of Tiltwolf, MacDaRacc, Rumi, and Lathreas - is creating a comprehensive review of fur, feathers, and scales, spanning from basic biology, to proposing engineering solutions. They're approaching the end and aim to have it fully written and edited by the end of Q2. We're planning on a long-form research update in Q1, and a public presentation in Q2. The project should be ready to wrap up in Q3, and in Q4 we intend to formally retire the project so that followup projects can get a fresh start.

The Wnt Peptide project - also led by the one-wolf army, Tiltwolf - is following up on a hypothesis generated during the Integument Review project, about a specific protein interaction we can use to cause hair and fur to have a soft texture. The project will start Q1 with peptide probing membranes, following plans discussed in Tiltwolf's articles in the November and December 2022 newsletters. In Q2 and Q3, Tiltwolf plans to further characterize protein interactions using pull-down assays, and report results in a public presentation and long-form research update. Finally, in Q4, we aim to get a manuscript out the door.

The Enhanced Tail project team - mainly Bleddyn, Mecknavorz, and Nalco - is hard at work engineering an active, expressive tail that feels natural to wear. They are starting the year by optimizing their active electrodes to detect muscle activity. (And yes, active electrodes appear to be working well, and solved the issue the team previously ran into!) The team is also developing a signal processing tool for getting relevant information from EMG readings. In the middle of 2023, the project team will start developing code for tail motor control, and towards the

end of 2023, will integrate the muscle sensing with motor control in a combined input-output unit. We're aiming for two long-form research updates, and hope to host a public presentation for the project by the end of 2023.

We've got so many other things going on, too. There's other projects ongoing, and other new projects in the works. Nix has been leading the Gender Resources project team through a transitional period - now that the first version is released on our website, and team members are coming into the project again with fresh eyes, they're planning what the next stage will look like. And Coltyn, a new volunteer, will be leading development of a new research project, focused on basic biology and engineering of the eyes.

Ellie has really taken charge of the newsletters, and is now regularly asking people to contribute articles (with deadlines!); she's got her vision and it's awesome to see it develop! Moonbeam has led our community on Discord to become one of the most genuine and welcoming environments I've ever seen, now consisting of over 430 people. And, one of our moderators, Hyper, is planning lots of new events for the community, including both fun/chill events and serious/intellectually stimulating events.

Syralth is in the process of wrapping up our new Intellectual Property policy, and also setting up an efficient way for us to procure consumables and reagents for R&D. Serathin, our Treasurer, has been setting up some new financial systems for us, and plans on shifting us to a different bank with an easier-to-use online portal and lower fees. Svaros is working on a new community feedback survey to keep a finger on the pulse for how we're doing. Keiro has already simplified some of our IT management, and is researching better options for some administrative software that we use, such as for ~~Human~~ Volunteer Resources.

...Whew. That was a lot!

I think it's safe to say that a lot of good things are in store for 2023.

Ultimately, we're motivated by the dream, and belief, that you should authentically be the person you want to be. The people in our organization all have 'skin in the game' and feel an unstoppable draw to making that a reality.

We sincerely thank you for helping us get this far already, and we can't wait to share our coming progress with you. 2022 was our best year yet - but it won't keep that crown for long!

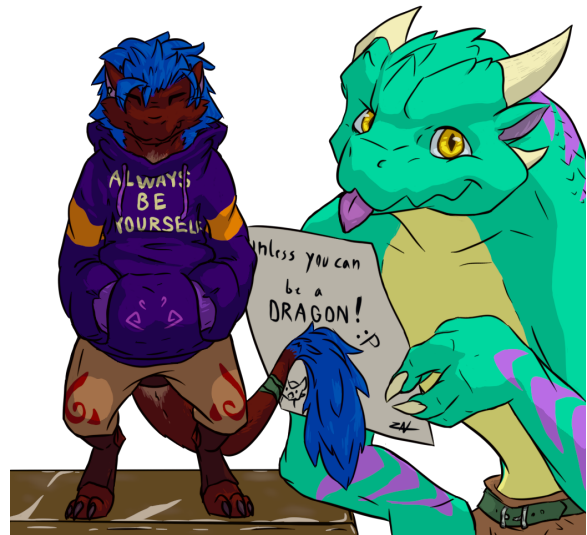
FFF's First Art Competition!

By Hyper | January 23, 2023

Howdy y'all, Hyper here to talk about our first ever art competition! Although we only gave about 20 days for submissions, we got a total of 7 wonderful pieces. From poems to paintings, and even some photos, we collected a variety of mediums and expressions for the prompt "Form Eurphoria". With so many lovely works to choose from, it was certainly a challenge to pick just one to be the winner. But I'll just skip to the reveal, first place goes to krokorokorok with their submission "A Future I Yearn For"! Second and third place were a tie between Hiuki's "Just Remember" and Quirin's "Chata Pounces in the Snow". Fourth place was taken by yours truly with "Evelyn", fifth place by Dragonfeathers's "Sleeping Curled", sixth place by ThatWeasel's "Tailored Freedom", and in seventh place hurtbear's "Untitled" (which is the actual title). Thank you to everyone who participated, I think this went amazingly! I absolutely hope we can host another art competition in the future! If you'd like to see all the submitted works they'll be posted on a special part of the website for all the visitors to see how amazing our community is!



krokorokorok's "A Future I Yearn For"



Hiuki's "Just Remember"



Quirin's "Chata Pounces in the Snow"

ARF Update

By SiberDrac | January 22, 2023

Many of the showstopper bones we all know and love appear in beautiful marching order. My favorites, in fact, are so organized as to be named after the Roman phalanx – that is, the phalanges of the finger and toe bones. However, the bones that keep those lanky, spotlighted structures tied neatly into our bodies are much less perfectly defined in a geometrical sense. These include the small, almost spheroid bones of the wrist and ankle; the gorgeously puzzle-like, interlocking structures of the spine; and the topic of my most recent discussions with the Anatomy Reengineering Framework, the scapulae.

The scapulae, better known by the decidedly cooler term “shoulder blades,” are wing-shaped structures in the upper back that help connect the arms to the torso. To understand how to free them from their initial form, Lathreas and I needed to better understand their function. We looked broadly across species as well as deeply back in evolutionary time to find the most parsimonious idea of a scapula, so that it could be most fluidly defined and thus easily digitally manipulated in many-dimensional models. A lot of information was missing, but we boiled what we could down to a few points:

- 1) The scapula is either fused to or paired with the coracoid bone as a “scapulocoracoid” in comparative anatomy, so they should be treated as a single unit
- 2) That unit is a flat triangle with a ridge rising out of the front, making it three-dimensional
- 3) The triangle starts as a small, vaguely pyramidal ball that gets stretched like putty as an organism grows to attach the powerful muscles of the chest and back to each other and to the arms

There are volumes more detail, but these give us the most basic shape possible and what

that shape does. From that, it can be implemented with a biologically accurate framework into a digital model with defined parameters that can then be molded to our purposes. For my part, I was happy to tell the software team, “It’s a... squished... pyramid... bone” and vanish back into the hedges, ever ready to pounce again with spooky, skeletal esoterica.

Welcoming Coltyn to our Scientific Team

By Coltyn | January 23, 2023



Coltyn (he/they) i.e., Chris DeVera, PhD is a biomedical scientist who was awarded his PhD in biomedical science in December 2020. He is currently a post-doctoral fellow at the National Institutes of Health (Bethesda, MD, USA) in the National Eye Institute. During his PhD, he was focused on the retina and the role the retinal pigment epithelium played in maintaining the long-term viability of photoreceptors, which are the cells responsible for vision in a majority of vision based organisms on Earth. Their work during their PhD resulted in several first and co-first authored publications. That work was presented in several national and international conferences. Coltyn is a highly

experienced biochemist, immunologist, molecular and cellular biologist, and geneticist.

His role on the team will be to start up a new project that focuses on identification of biotargets that can customize the front facing aspects of the eye such as: pupil size, pupil shape, iris color, cornea color, overall eye shape, and eye lid morphology. As an expert on eye biology, they are really excited to begin working on this project which is aptly named "Eye Fur Detail" with a much more scientific internal working project name :P I look forward to working on this with the rest of the FFF team and seeing where this project and the many other projects slated turn out in the organization for years to come :3

If you are passionate about eyes or in general cellular biology especially when it comes to neurons, then feel free to send me an email (coltyn@freedomofform.org) and we can get a discussion going! I'm looking for people to join my team!!